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Update on State Management of Peat Development

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INTRODUCTION

Researchers of peatland development agree in asserting that any full assessment of the development's magnitude and significance will depend on a particular proposal and site. Based on peat activities in this country and abroad, researchers have outlined generic impacts that may be expected. But additionally, they have stressed that effects of scale, methods used, and location may minimize or enhance these impacts. The nature of the site itself, the presence of significant features, must also be considered under our current system of evaluating impacts. In this country we are relatively inexperienced with both peat itself and its development technology and operations.

The Department of Natural Resources has adopted a cautious leasing policy which works within this uncertain situation in three ways: 1) by controlling the size and conditions of a lease based on the peatland, watershed, and mining method; 2) by selecting available and environmentally-suitable site based on site and use capabilities; and 3) by allocating a peatland for many uses so as to be flexible in allowing a variety of developers who can demonstrate particular uses.

This working paper reports on the DNR's current management activities and the status of leases. It assumes previous knowledge of the Department of Natural Resources' Peat Program, the peatland environment, and the issues surrounding peatland development. The scope of this paper does not include the wider issue of a peatland industry in Minnesota. Leases for larger scale development will not be granted until technical and environmental feasibility is well documented both conceptually and by demonstration on a small scale. Monitoring will be required for actual demonstrations so that the impacts of different techniques may be assessed. Meanwhile, the state is planning to mitigate environmental impacts of small scale leases by attempting to identify and avoid possible impacts of high magnitude and significance.

ENVIRONMENTAL IMPACTS: POLICY SUMMARY AND RATIONALE

In 1981, the Department of Natural Resources adopted a policy to guide the development of the state's peat resources (see Minnesota Department of Natural Resources, February, 1981). The policy addressed peatland uses, environmental management, legislation, administration, leasing, and implementation. In planning for potential environmental impacts, the department:

1. described a systematic and comprehensive effort to provide for peatland preservation;
2. clarified and coordinated regulatory processes regarding environmental controls;*
3. defined a development policy that would consider rate of development, economic and social effects, and possibilities of mitigating or avoiding environmental impacts;
4. recommended a 3,000 acre maximum lease size as a guideline that would be somewhat flexible according to a specific site and proposals;
5. promoted multiple uses of peatlands, while suspending leases for larger scale energy mining and biomass production; and
6. recommended amendment of the existing mineland reclamation act to accomodate peat mining.

Central to implementing this policy is the department's program to define available and environmentally suitable sites ahead of further leasing, and to control impact-related development and reclamation procedures through lease conditions. Although impact mitigation is not the only consideration underlying the policy, it nonetheless is a primary one. A brief review of the rationale follows.

The 3,000 acre maximum placed on lease sites attempts to address the long uncertainty surrounding the estimate of impact magnitude from large-scale development. Large-scale proposals would require large contiguous areas of peatland, perhaps representing a more disruptive land use change. Impact

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*The Peat Program has also submitted recommended water standards to the Pollution Control Agency, which are currently being negotiated. The standards will apply to the lease just granted in December 1981 (see section III).

magnitudes in such areas are potentially greater than in peatlands of smaller acreage because of the complex ecology of Minnesota's larger peatlands. Monitoring studies of water quality and quantity and vegetation and wildlife research suggest that the environmental impacts of development may be successfully mitigated on lease tracts of the recommended size.

Proper siting of a project within a watershed and relative to other resources both on and offsite may also alleviate impacts. In particular, the department intends to avoid areas of significant natural features and habitat, minimize conflict with potential use of important forest resources, and prevent extensive water quality and quantity impacts. Siting with respect to availability of support facilities and population characteristics meets not only development requirements but also conditions minimizing social impact.

The department also foresees mitigating impacts by approving operating and reclamation procedures. Establishing buffer areas may protect offsite vegetation and water resources. Settling ponds, air pollution control equipment, erosion control structures, wind barriers, and operating methods may mitigate water and air effluents. Selection of the mining method will determine reclamation alternatives. Reclamation staging alleviates impacts caused by exposed land. Site plans, drainage plans, and time frames will be controlled by the department through lease conditions. The Peat Program intends to prepare a reclamation manual for both developers and managing agencies based on the results of its reclamation studies. It will provide guidelines for selecting the suitable reclamation option and for conducting mining consistent with the reclamation planned.

LEASING STATUS

The Peat Program currently manages two active peat leases, one that preceded the establishment of the Peat Program and one that was leased in December 1981. The first, Michigan Peat in Cromwell, Carlton County, is a horticultural operation. Its lease expires in three years and the company has asked for both an extension and additional acreage. Five hundred acres of its current nearly 3,000 acre lease are in production. The department intends to renegotiate the lease and to include the new conditions outlined in its 1981 Policy Statement. Environmental monitoring has been ongoing.

In December 1981, the department leased a 620 acre peatland west of Central Lakes in St. Louis County to Fleet Management and Development Corporation. It was awarded by a competitive bidding process. Little controversy was associated with this lease since the area will first be disturbed as part of the Oglebay Norton tailings operation. The company has proposed using the peat for energy, although the specific plan has not been outlined. Preparation of the Environmental Assessment Worksheet (EAW) is now in progress, for which the company will have to submit its detailed plan. The Environmental Impact Statement (EIS) may not be required if the project is viewed as an addendum to the Oglebay Norton tailings operation.

The department hopes to lease two other sites by the end of the year (1982), probably sites within the Arlberg Bog in Southwest St. Louis County. Development interest in this bog dates back to at least 1977.

Frequently American and European companies contact the department inquiring about or offering proposals for specific areas of peatland. Small-scale leases under 160 acres for which sales (by competitive bidding) are unnecessary would be negotiated. Negotiated sales may be employed for lease expansions and when only singular interest or use is documented. When sufficient interest is in a larger area, the department will hold a public lease sale.

The department hopes to stimulate further interest in peat development by widely circulating its information on available sites to the public. Economic barriers remain significant. Cost of bog preparation, clearing and draining are estimated at $700 per acre (Asmussen, personal communication). With a 3,000 acre lease tract, $2 million is required to prepare the bog for production, a figure not including capital investment and machinery. Minnegasco, in reporting on its recent feasibility study, also confirmed that certain diseconomies of scale exist, particularly with regard to draining (Minnegasco, July 1982).

SITE SELECTION ACTIVITIES

Development Siting

The DNR determined peatland availability based on criteria that evaluate a site for its resource potential, satisfaction of minimum development requirements, and potential for significant environmental and land use effects. The entire site selection process is in four phases, the first two of which involve mapping (see Table 1). Maps were prepared with the Land Management Information Center (LMIC), using LMIC data and the Peat Program's inventory information. A report on the development siting process, preliminary mapping, and associated activities are expected by the end of the year, 1982.

TABLE I. DEVELOPMENT SITING PROCESS

I. ADMINISTRATIVELY AVAILABLE PEAT
   - A. Proximity to cities (within 50 miles)
   - B. Accessibility to major roads (within one mile)
   - C. Size (greater than 1,000 acres)
   - D. Unprotected (legally designated and proposed)
   - E. Ownership (state)

II. FURTHER EVALUATION
   - A. Forest cover and productivity
   - B. Surface water
   - C. Watershed
   - D. Mineral units (ground moraine, beachridge, etc.)
   - E. Peat type and depth

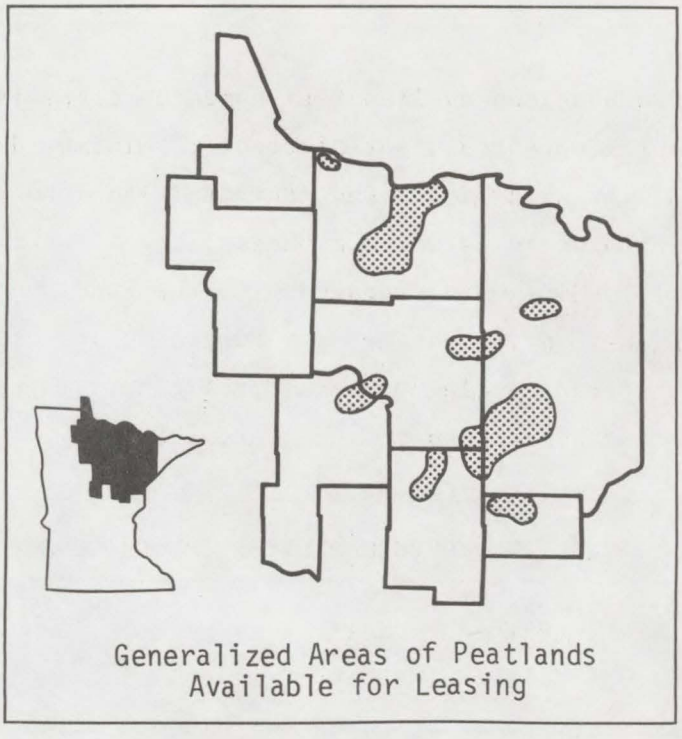
III. ONSITE INVENTORY (depth, significant resources, hydrology)

IV. INHOUSE SCREENING

SOURCE: Johnson, R., Minnesota Peat Program, personal conversation, 1982.

Completed work from Phase I, "administratively available," identified nearly a million acres of the state's peatland in eight northern counties suitable for mining or cultivation (Southwest St. Louis, Koochiching, Aitkin, Lake of the Woods, Beltrami, Itasca, Cass, and Carlton - - see Figure 1 and 2). These areas are managed by the state, are not currently recommended for protection, and meet certain minimum development requirements. The identified acreage does not, however, take into account peat depth, a critical factor in commercial interest. Another 2.5 million acres of peatlands are held in reserve. Lands in reserve

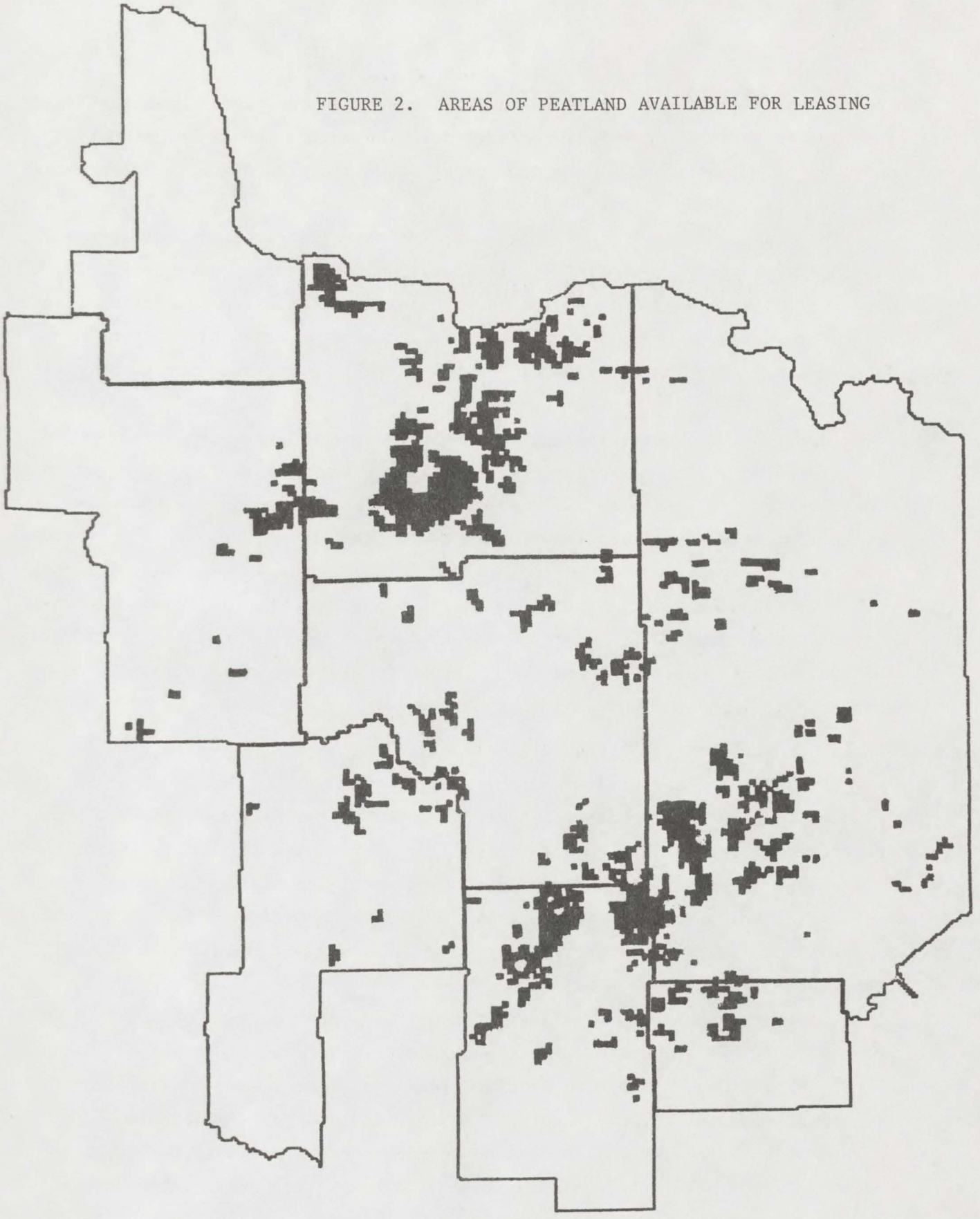
FIGURE 1



Generalized Areas of Peatlands
Available for Leasing

SOURCE: Minnesota Department of Natural Resources, 1982

FIGURE 2. AREAS OF PEATLAND AVAILABLE FOR LEASING



SOURCE: Minnesota Department of Natural Resources, press release, 27 May 1982

are presently too inaccessible to develop, are under management that prohibits development, or are exceedingly sensitive to the environmental impacts of development. Additionally, the department identified 123,000 acres of private peatland, over which it has no jurisdiction.

The maps of Phase II, completed only for the pilot area of Southwest St. Louis County, are more specific tools to help differentiate among available sites. Impact-related factors include examining the occurrence of significant forest resources, the proximity to certain water resources, and the type of watershed and location with respect to its outlet. Also, resource capabilities are compared.

The last two phases are important both to further screen environmentally suitable sites and to gather and evaluate site data which could inform guidelines for the drainage plan, site plan, and reclamation options. Phase III, onsite inventory, resembles the field work required by the EAW for any eventual proposal. The peat is measured and analyzed. The existence or nonexistence of any outstanding natural feature or species is verified. In Phase IV, a type of inhouse screening, the department would review all social and ecological information and presumably consider nonenvironmental factors such as degree of public controversy and development interest.

Peatland Protection and Preservation

In 1978, the Peat Program established a Task Force on Peatlands of Special Interest to make recommendations concerning the ecologically significant peatlands in the state. This task force included University scientists, state wildlife and parks personnel, and representatives from the Minnesota Natural Heritage Program and U.S. Geological Survey. A list of candidate areas for potential preservation status is completed (see Figure 3) and detailed maps are being prepared.

Twenty-two peatlands were identified with a total acreage of about 590,000 acres, 360,000 of which are on state-administered lands. Six peatlands are either in existing or proposed wildlife management areas and are thus protected from development. These figures, however, include both "protection" and "preservation" areas, two different management zones created to recognize the ecologically significant core area itself and the buffer area (watershed) required to maintain its ecological integrity. Restrictions related to the latter would only prohibit ditching or excavation of peat that could alter surface-water

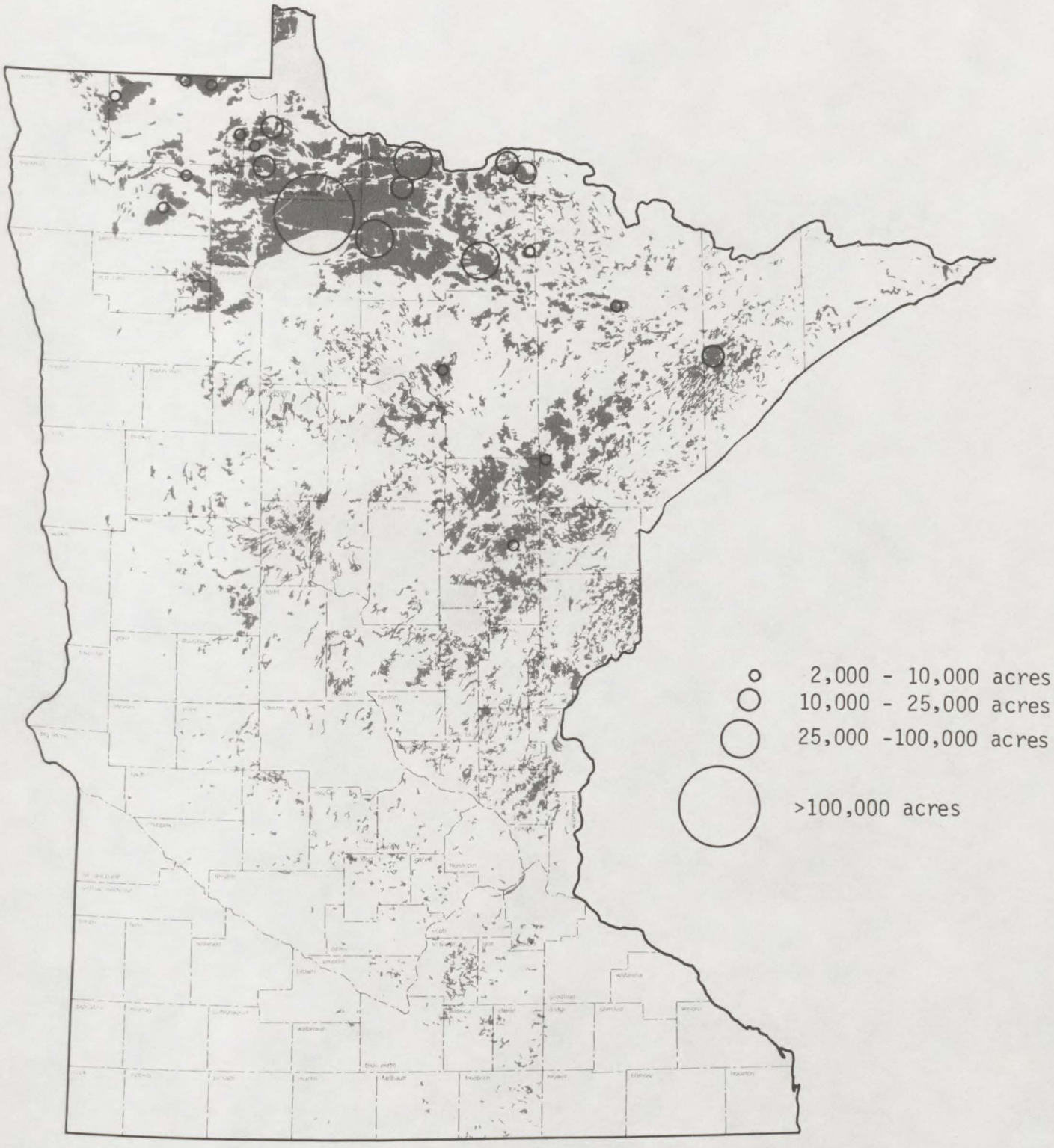


FIGURE 3 The Locations and Relative Sizes of Peatland Preservation Candidate Areas in Minnesota

SOURCE: Minnesota Department of Natural Resources, Minnesota Peat Program Final Report, August 1981

or ground-water flow. The Core Preservation Zone contains the most significant features of a peatland complex and may require additional protection. This would be determined on an individual basis but could include restricted road construction, muskeg tractor use, and vegetation management techniques.

Although preliminary information on candidate areas and a generalized map have been published (Minnesota Department of Natural Resources, August 1981), several activities are still underway. The major preservation document will be completed in June 1984. This will include discussion of criteria (see Table 2), description of individual areas, and management recommendations. The task force concentrated its efforts on peatlands greater than 3,000 acres. Information-gathering for peatlands smaller than 3,000 acres will soon begin. Data on the archaeological significance of peatlands has yet to be added. The task force intends to expand its membership to include state and federal representatives of the different agencies having jurisdiction over candidate areas. This, the task force believes, will enhance the opportunity to implement or renegotiate their recommendations. The Nature Conservancy and other similar organizations will be alerted to ecologically significant areas located under private ownership. New research in peatland hydrologic systems would aid in assessing the adequacy or modification of the buffer area.

Implications of Mapping Program

By determining site and use capabilities, the department is able not only to establish a development siting process, but also to inform long-range policy discussion. First, total resource estimates, approximately 6 million acres within the state, are less important than the identification of peat resources available for development and management. About 2.6 million acres occurring in northern Minnesota counties may be available for leasing (when not excluding candidate preserved areas). Of this, about 1.3 million acres, half of the total, is deep peat of commercial interest. The department notes that Koochiching county, with the greatest peat acreage of any county, has deposits of available peat totaling 257,000 acres. One large-scale peat gasification facility could consume all of that county's developable peat in about thirty years (Minn. Dept. of Natural Resources, August 1981).

Secondly, under current state leasing policy which will not grant larger-scale leases (over 3,000 acres), field results will suggest whether or to what

TABLE 2 DRAFT CRITERIA FOR NOMINATING/EVALUATING/RANKING PEATLANDS OF SPECIAL INTEREST

I. NOMINATION CRITERIA

A peatland may be nominated as an area of special interest if it contains "elements"*, special wildlife habitat, and/or state protected species not listed as an Element.

*An Element is an outstanding natural feature and/or species of particular concern because it is rare or endangered on a national or statewide basis.

Element Types

1. plant species
2. animal species
3. peatland landforms
4. plant communities
5. special wildlife habitat

II. EVALUATION CRITERIA

Nominations are evaluated and ranked based on the rarity, quality, viability, and scientific value of each site.

A. Rarity

B. Quality

1. Representativeness (not applicable to rare flora & fauna)- excellence and completeness; extent to which an element corresponds with our concept of the identified element.

2. Permanence of Population/Feature
   a) biological viability - health, (not applicable to physical elements)
   b) physical permanence - transitory-erodibility (not applicable to biological elements)

3. Extent of Disturbance

C. Site Viability - Defensibility

1. Extent of physical isolation
   a) size of peatland area
   b) hydrologic isolation (confined or open)
   c) location within watershed
   d) presence of buffer zones

2. Presence or potential of developmental pressure/ competing land use

3. Public attitude/interest

D. Scientific Value

SOURCE: Minnesota Department of Natural Resources, 1982 draft copy.

extent peatland preservation may be in conflict with peat development. The 947,000 acres identified for leasing in spring 1982 excludes both preservation and protection areas, including the entire Red Lake peatland complex. Fifty percent of this, or 473,500 acres, may be deep peat of commercial interest. (As indicated by the preliminary figures in the previous paragraph, inventory experience suggests the proportion of total peat deposits to deposits deeper than five feet may average to be 50 percent (Aaseng, personal communication). The department notes that in Finland, where peatland development has been progressing for over thirty years, only 100,000 acres have been developed (Asmussen, personal communication).

The department's policy to hold lease sites to about 3,000 acres is based on both the extensive environmental studies sponsored by the program and European experience. Lease tracks of this size, the department believes, may be successfully controlled for impact mitigation and are of sufficient size to support a viable energy production industry. For example, a 3,000 acre site of an average five-foot depth can supply a 30 MW generating facility for about twenty years. At present there are twenty existing energy facilities in northern Minnesota communities that could use peat as a fuel and are located within twenty miles of substantial peat deposits (Asmussen, personal communication).

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